UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

Exemption No. 5535

In the matter of the petition of

United Airlines **Regulatory Docket No. 26971**

for an exemption from § 121.314
of the Federal Aviation Regulations

GRANT OF EXEMPTION

By letters dated August 19, and September 25, 1992, Mr. Jim Takeuchi, Director, Engineering Systems and Standards, United Airlines, petitioned for exemption from § 121.314 of the Federal Aviation Regulations (FAR) to permit a 6-month extension in the compliance time for the retrofit of Class C and D cargo compartment liners, over the time currently granted to the Air Transport Association of America (ATA) for all affected operators in Exemption 5288B.

Exemption 5288B was granted on March 20, 1992, and was a second amendment to Exemption No. 5288 which was granted on March 18, 1991. That exemption permits the operation of airplanes that do not comply with §§ 121.314 and 135.169(d) after March 20, 1991, under a specified schedule, depending on the model. In addition, the exemption grants fleet wide relief for repairs. This relief is divided into two parts: (1) new repairs must comply with the regulations after September 20, 1991, and (2) all repairs must be in compliance after March 20, 1992. The exemption was subsequently amended by Exemption No. 5288A to allow relief for two operators from the "new repair" portion of the requirement by extending the compliance time by 30 days. Exemption 5288B was issued to allow until October 20, 1992, to comply with repairs specifically addressed to "design features" of cargo compartments.

ANM-92-033-E

Section of the FAR affected:

Section 121.314, as amended by Amendment 121-202, requires, in part, that after March 20, 1991, all Class C and D cargo compartments greater than 200 cubic feet in volume, used on airplanes in air carrier, air taxi and commercial service, have liners constructed of fiberglass or material satisfying the test requirements of § 25.855, as amended by Amendment 25-60, or, in the case of liners approved prior to March 20, 1989, aluminum.

Related Section of the FAR:

Section 25.855(a-1)(1), as amended by Amendment 25-60, incorporates a new flame penetration test using an oil burner. This test is required of liner materials in Class C and D cargo compartments on affected airplanes, regardless of whether or not the material is fiberglass. These test standards are contained in Appendix F, Part III, of Part 25. Section 25.855(a-1)(1) applies primarily to newly designed airplanes for which an application for type certificate is made after June 15, 1986. As noted above, the test standards of this section also serve as an optional means of compliance with § 121.314 for other airplanes.

The petitioner's supportive information is as follows:

In their original petition, ATA summarized the scope of the difficulties with repairs. It was noted at that time that, while vendors were optimistic at their ability to produce repairs that were both technically qualified and quantitatively sufficient, work still needed to be done to assure timely incorporation into the fleet of new repair systems.

" Due to the introduction of new technology relating to simple cost effective aircraft cargo bay liner repair techniques, and lack of an alternate method, United Airlines hereby petitions for an amended partial exemption to FAR 121.314, Amendment 121-202. In particular, United seeks an extension to April 20, 1993, from the current
October 20, 1992, compliance deadline (as contained in partial exemption number 5288B) for completing re-repairs of contoured liners.

" BACKGROUND: Amendment 121-202 requires that each Class C and D transport category airplane cargo compartment greater than 200 cubic feet in volume, have ceiling and sidewall liner panels constructed of:

(1) Glass fiber resin; or
(2) Materials which meet the test requirements of Part 25, Appendix F, part III.

" The rule also states that the term "liner" includes any design feature, such as a joint or fastener, which would affect the capability of the liner to safely contain a fire.

" This rule has been interpreted to mean that liner repairs previously made for punctures, tears, and slits, must be "re-repaired." Also, these re-repairs must be constructed from; (1) glass fiber reinforced resin attached with fasteners capable of allowing the glass fiber reinforced resin to safely containing a fire, or (2) any repair material when applied to the basic liner, will allow the repair/liner combination to meet the burn test requirements of Part 25, Appendix F, part III.

" The majority (95 to 98%) of cargo bay liner surface area is made up of flat surfaces. Through the use of FAA approved repairs developed for flat surfaces by Akro Fireguard and Pioneer Plastics/Conolite, United has completed all re-repairs to flat surfaces. These were simple and inexpensive re-repairs accomplished in place on the aircraft and completed several months ago.

" PROBLEM: The above rule was also interpreted to include contoured panels as "liners." These are panels which make up 2 to 5% of the cargo bay surface area and are typically made from fiberglass "layups." These same panels are often referred to as "design features" but are not to be confused with those design features (light adapter rings, temperature sensor panels, air conditioning ducts, flexible panels) which require replacement due to material non-compliance. Any existing repairs to these contoured liners must also be re-repaired to the same standards.

" During an industry/ATA meeting involving the FAA on January 28, 1992, it became apparent that no contoured surface re-repair process existed short of panel replacement. Both Boeing and Akro Fireguard advised they believed they could have approved repairs re-repairs available by the April 1992 time frame. Since it was apparent that the then current March 20, 1992, deadline would be exceeded, a petition was filed and granted (Exemption No. 5288B) to extend the re-repair deadline to October 20, 1992, (the petition also requested additional time for operators to complete flat surface repairs).

" Akro's repairs did not become available until May. The repair uses a fiberglass cloth patch secured with fire resistant epoxy, but can only accommodate damage two inches wide. Existing fiberglass layup repairs, intended to be covered by the Akro repair, are typically wider.

" Boeing did not publish their repair until June. Their re-repair consists of adding a series of screws and nuts around the periphery of a standard fiberglass repair. This repair had several shortcomings. To accomplish a re-repair using this technique, liner removal is necessary to avoid drilling damage to concealed items behind the panel. The multitude of fasteners required (24 for a 10" X 10" patch) dictates a spares pool and shop accomplishment to minimize aircraft down time. In addition, the re-repair was not practical for edge damage, or areas where fasteners would interfere with surrounding objects.

" It was now apparent that the industry still had no practical, cost effective repair. It was also apparent that the costly approach of panel replacement was not justified when repair technology was so close to satisfying the rule.

" SOLUTION: United contacted Akro in early July, expressing a need for; (1) a practical aircraft re-repair technique, (2) a practical shop repair technique, and (3) an improved aircraft repair capable of repairing damage up to five inches wide. Akro responded by demonstrating to United in late July, a coating product, applied like paint, capable of protecting existing repairs when tested to the FAR requirements. Akro is also reformulating their existing fire resistant epoxy product for us in shops, and seeking expanded damage limits approval for their existing aircraft repair. With the introduction of these three products, a sensible, practical, cost effective approach to contoured liner repair and re-repair will now be available. This approach will save many valuable manhours of labor and over $1,000,000 in panel replacement cost, an important goal when considering the spirit of President Bush's Economic Recovery Act.

" RATIONALE FOR THE REQUESTED EXTENSION: A six months extension is required beyond October 20, 1992. Akro Fireguard will need 90 days (60 available prior to 10/20/92 deadline) for development and certification, and 30 days for product packaging, order filling, and distribution. United will need 30 days for product packaging, order filling, and distribution. United will need 30 days for receiving and distribution to points of intended use, plus 90 days for re-repair.

" THE PUBLIC INTEREST: As stated in the petition leading up to Exemption No. 5288B, "The original intent of FAR 121.314 was to enhance the safety of air service by improving the resistance of cargo bays to fire. This intent has been largely met through the replacement of materials in cargo liners themselves. The benefit in flame resistance to be gained from the replacement of a specific repair is minuscule." The last sentence is even more appropriate for this petition. As implied earlier, the exposed contoured liner surface area is only 1/20 of the total surface area. At United, the only concentration of contoured liners needing re-repair reside in older 737-200 and 727-100 aircraft (10% of United's total fleet). Several ceiling liners have undergone repair or reinforcement at the protruding corners.

" To take advantage of the new coating technology, United intends for the petition to cover all fleets, however, there is even less exposure to the public on the balance of United's fleets. As summarized below, either repaired areas are very small, or repairs have not been required due to location or newness of fleet:

DC10 Cargo door (3) liner vertical edges which are nested into door frame when closed.

727-222/222A Curved surfaces around cargo door mechanism and air conditioning duct.

737-322/522 Ceiling liners remain undamaged due to newness of fleet.

747 Ceiling panel above bulk cargo door and doorway vertical post covers remain undamaged due to location and installation.

757 Three small cargo doorway liners remain undamaged due to location.

767-222 Cargo doorway liners do not require re-repair since their total replacement is required due to material non-compliance.

767-322 Cargo doorway liners remain undamaged due to newness of fleet.

" Grounding of non-compliant aircraft after October 20, 1992, would not be in the best interest of the public when offsetting gain is virtually imperceptible."

" As of September 22:

- 747 37 of 49 aircraft have been checked and are in compliance
- 757 All aircraft in compliance
- 767 All aircraft in compliance"

A summary of the petition was published in the Federal Register on September 28, 1992, (57 FR 44605). No comments were received.

The Federal Aviation Administration's analysis/summary is as follows:

As noted by the petitioner, design features comprise typically only 2-5% of the affected surface area of the cargo compartment. In addition, the issue of the integrity of the design feature repair is only of concern once the original liner material has become damaged. Thus, the majority of the time, this small area is equivalent, in terms of fire resistance to the larger flat surface areas of the cargo compartment. Repairs for design features, that comply with the requirements of § 121.314, have only recently been developed for certain applications and are still being developed for others.

The primary compliance problem with the existing repairs is the performance of the repair when subjected directly to the burner flame. The primary function of the repair is to provide an air barrier and inhibit any increased ventilation through the compartment due to the damage. The repair methods currently used would therefore be satisfactory if the flame does not impinge directly on the repair. Over the long term, it must be assumed that a fire could impinge directly on the repair. The repair should, therefore, provide the same level of protection as the basic liner panel. In issuing Exemption No. 5288, the FAA considered that a reasonable amount of time was warranted to implement recently developed repair methods into the fleet. The terms of Exemption No. 5288 permitted a one year extension in the compliance date of Amendment 121-202 to upgrade all repairs in cargo compartments, regardless of when they were initially made. In order to facilitate the introduction of new repairs into the fleet, only a six month extension was granted, after which any new repair had to comply with the regulation. In granting an initial one year extension for replacement of all existing repairs the FAA considered many factors, including the repair kit suppliers' stated ability to provide the necessary number of kits to the operators. Another major factor was the operators' estimates of their capabilities in replacing existing repairs, fleet wide.

As noted by the petitioner there is a need for special repair methods for "design features." Design features are defined in Exemption No. 5288 as lighting lenses, fasteners, airducts, etc. that are not

primarily cargo liners, but whose failure would compromise the ability of the compartment liner to perform its intended function. As noted in Exemption No. 5288 and earlier in this exemption, repairs were not explicitly addressed in the promulgation of the regulations. In granting Exemption No. 5288B, the FAA recognized that the need for special repair methods, coupled with small affected area, justified an exemption for the compliance time previously determined, and additional relief was granted. The repair schemes under development at that time were evidently not sufficient to resolve all of the operators' needs. However, as noted by the petitioner, there are a limited number of methods available for repair of design features and more are forthcoming. Nonetheless, the absence of repairs for all detail parts leaves only the expensive alternative of replacing such damaged detail parts. Due to the economic and logistical burden of having to replace each such feature when damaged, the FAA has determined that additional time to develop and implement a suitable repair is warranted. The FAA is aware that a major supplier of repair kits is in the process of obtaining approval for an expanded usage of a currently approved method, which should effectively provide a means of repairing virtually all design features in the near term. Other, more versatile repairs may become available in the future, but it appears that means will exist to support the compliance times requested.

The petitioner has asked for a six month extension from the terms of Exemption No. 5288B for repairs to design features. The FAA concurs that a six month extension for repairs to design features is warranted. Since there are approved methods at this time, six months extension is reasonable to allow for the necessary approval, distribution and implementation processes that must occur for a new repair method, or expansion of the usage of existing repairs. In granting this exemption the FAA notes that the petitioner has provided information on the actual status of the airplanes affected by the petition. These data illustrate that while all airplanes are eligible for relief, the vast majority of the airplanes in the petitioner's fleet are, in fact, in full compliance at this time. This further indicates that a small extension of the compliance time will have a negligible impact on safety.

In consideration of the foregoing, I find that a Grant of Exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the petition of United Airlines is hereby granted with the following provisions:

> Repairs to cargo compartment liner details of transport category airplanes, made after April 20, 1993, must comply with § 121.314 as adopted by Amendment 121.202.

Provisions of Exemption No. 5288, 5288A and 5288B together with their conditions and limitations, remain the same and are applicable to this exemption.

Issued in Renton Washington, on

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Darrell M. Pederson
Acting Manager,
Transport Airplane Directorate
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revised per DA editorial comments on 10-20-92